

Léo: head design brief

Version 17 head, aluminium finish study

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What this is. A short public summary of the head of Léo, a home companion robot in development. The pictures in [Figure 1](#) and [Figure 2](#) are computer renders of the current design with simulated materials, not photographs of a built head. The animated model is at <https://share.behaviour.ai/head.html>.

1 The head at a glance

Size (W × H × D)	about 165 × 186 × 158 mm (shell only)
Face	two moving eyes with upper and lower lids, two brows, two lips
Eyes	pan ±30°, tilt ±20°; 9 mm pupil lit from behind
Ears	two motorised paddles
Senses	camera in the forehead; microphone array in the crown
Neck	pleated silicone boot on a charcoal collar with a light ring

2 Materials and finish

- **Hood and face plate:** 6061 aluminium, machined from solid with a 1.5 to 2 mm wall, bead-blasted and clear anodised in one batch so the two parts match.
- **Lower shell and back door:** matte charcoal nylon (PA12), a deliberate contrast with the metal.
- **Neck boot:** charcoal silicone.

The metal parts are a finish study. Before they are made they need a redesign for machining: tapped bosses in place of heat-set inserts, generous edge radii, insulated wire routes, and isolation of the microphones from the shell ([section 5](#)).

3 A minimal face

The face is meant to read as plain metal with only the features that move: the eyes, the brows and the lips. Earlier versions carried large clear windows over the brow and mouth mechanisms; these are being reduced to the smallest openings the brows and lips need to travel, flush with the face, and kept clear of the eyes (Figure 1). The renders show the intended look; the exact opening sizes follow from the redesign.



Figure 1: Three-quarter, front and side views (render, simulated materials).



Figure 2: The left eye: white globe and lids, 9 mm pupil lit blue from behind (render).

4 Movement

The animated model (<https://share.behaviour.ai/head.html>) plays a short sequence: Léo notices someone, says hello, listens, is surprised and smiles. The eye, lid, brow, lip and neck motions are illustrative of the mechanism's range, not recordings of the robot.

5 Next steps

1. Redesign the hood and face plate for 6061 and export STEP files.
2. Reduce the brow and mouth openings to the travel of the strips ([section 3](#)).
3. Request machining and anodising quotes.
4. Review the neck's speed and torque limits against the heavier head.